PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
DGC 02 1342 004		

International Application No.	International Filing Date *(day/month/year)*	Priority Date *(day/month/year)*
PCT/AU02/01384	11 October 2002	17 April 2002

International Patent Classification (IPC) or national classification and IPC

Int. Cl.[7] H01F 7/02, B23Q 3/154

Applicant

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1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

   [X] This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of **8** sheet(s).

3. This report contains indications relating to the following items:

I	[X]	Basis of the report
II	[ ]	Priority
III	[ ]	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
IV	[ ]	Lack of unity of invention
V	[X]	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
VI	[ ]	Certain documents cited
VII	[ ]	Certain defects in the international application
VIII	[ ]	Certain observations on the international application

Date of submission of the demand	Date of completion of the report
14 January 2003	3 July 2003

Name and mailing address of the IPEA/AU	Authorized Officer
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/AU02/01384

I. Basis of the report

1. With regard to the elements of the international application:*

- [ ] the international application as originally filed.
- [X] the description, pages , as originally filed,
  pages , filed with the demand,
  pages **1 to 5,** received on **6 June 2003** with the letter of **5 June 2003**
- [X] the claims, pages , as originally filed,
  pages , as amended (together with any statement) under Article 19,
  pages , filed with the demand,
  pages **6 to 8,** received on **6 June 2003** with the letter of **5 June 2003**
- [X] the drawings, page **1,** as originally filed,
  pages , filed with the demand,
  pages , received on with the letter of
- [ ] the sequence listing part of the description:
  pages , as originally filed
  pages , filed with the demand
  pages , received on with the letter of

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language which is:

- [ ] the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- [ ] the language of publication of the international application (under Rule 48.3(b)).
- [ ] the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- [ ] contained in the international application in written form.
- [ ] filed together with the international application in computer readable form.
- [ ] furnished subsequently to this Authority in written form.
- [ ] furnished subsequently to this Authority in computer readable form.
- [ ] The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- [ ] The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. [ ] The amendments have resulted in the cancellation of:
   - [ ] the description, pages
   - [ ] the claims, Nos.
   - [ ] the drawings, sheets/fig.

5. [ ] This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report*

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	**1 to 18**	**YES**
	Claims		**NO**
Inventive step (IS)	Claims	**1 to 18**	**YES**
	Claims		**NO**
Industrial applicability (IA)	Claims	**1 to 18**	**YES**
	Claims		**NO**

2. Citations and explanations (Rule 70.7)

The following documents identified in the International Search Report have been considered for the purposes of this report:

D1 US 3665355 A (SASAKI et al.) 23 May 1972
D2 US 3727658 A (ELDRIDGE, Jr.) 17 April 1973
D3 US 5604960 A (GOOD) 25 February 1997

New Citations

D4 US 3483494 A (CROMIE) 9 December 1969
D5 US 3546643 A (VIROSTEK) 8 December 1970

These two documents were discussed in the "Background of the Invention" section of D2.

Novelty (N)

None of the cited documents disclose a pair of flexible strips being in a face to face relationship with one another and intermediate said connections defining a plurality of pockets and a plurality of magnets each being housed within respective of the pockets to permit movement of the magnets therein.

Therefore the subject matter of these claims is new and meets the requirements of Article 33(2) PCT with regard to the requirement for novelty.

Inventive Step (IS)

The claimed invention is not obvious in the light of any of the cited documents nor disclosed in any obvious combination, nor would the claimed invention be obvious to a person skilled in the art in the light of common general knowledge by itself or in combination with any of these documents.

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A MAGNETIC STRIP

Field of Invention

The present invention relates to a magnetic tape. The present invention also relates to an arrangement for packaging magnets.

Background of the Invention

A magnet is often used to hold an article. A typical magnet is composed of a hard, metallic material and, in use, attractive magnetic forces between the magnet and a magnetisable material are exploited to hold the article. Magnets find application in heavy industry, but are also used for domestic purposes. An example for the latter is the well-known fridge-magnet. Such a magnet is arranged to hold an article on a metallic door of a refrigerator. In this or similar applications the article is clamped between a metallic surface and a face of the magnet or alternatively the article is attached to the magnet which may be in direct contact with the metallic surface. Care must be taken to avoid that the magnet does not scratch or otherwise damages the article or the metallic surface.

Summary of the Invention

In a first aspect the present invention provides a magnetic tape comprising:

a pair of flexible strips being connected in a face to face relationship with one another and intermediate said connections defining a plurality of pockets; and

a plurality of magnets each being housed within respective of the pockets to permit movement of the magnets therein.

The two layers most preferably are substantially identical and preferably are welded together.

The magnets preferably have a substantially cylindrical shape which has a cross-section that is substantially round and are more preferably disc-shaped.

The flexible material may entirely enclose each magnet and preferably comprises a polymeric material.

The magnets preferably are located remote from each other and more preferably are spaced longitudinally along the tape in one or more rows.

Each of the magnets within the magnetic tape preferably is oriented such that the polarity of the magnets is substantially uniform relative to the flexible strips. The magnets preferably comprise a rare earth material.

The magnetic tape may be provided in form of a continuous rope-like tape.

The magnetic tape may comprise a label which may be used for advertising purposes and may also comprise at least one means for carrying an article such as a hook.

The above-defined magnetic tape has a range of applications. The magnet tape may, for example, be used to locate the article on a magnetisable material such as a door of a refrigerator. The flexible strip reduces likelihood of damaging or scratching of the article or of the magnetisable material by the magnet.

The magnetic tape preferably comprises a series of magnets of high strength. The magnetisable material to which, in use, at least one of the magnets attaches may be the article itself or another one of the magnets of the magnetic tape. For example, the magnetic tape may be used to enclose the article by forming a closed loop with individual magnets of the strip clipping to each other. Usually the magnet tape does not need to be adjusted to hold the article. The article may be one of many articles and the tape may be arranged to hold together all of the articles. The tape may hold together shower curtains and may also be used to secure fly-screen on cars or tents. Further, the tape may be used to hold together garments, to hold name-tags, and may find application as a cloth peg or may even be used to hold doors open.

In general the magnetic tape may be used for a novel way of packaging, distributing, selling and using magnets.

The magnetic tape may be sold like lengths of a chain or a rope cut to a required length. The flexible strip material may be selected to suit specific requirements such as cost efficiency for packaging and durability for long term applications. The magnetic tape may be rolled or pulled out to the required length and cut to that length. The user may then cut it to various smaller lengths, individual sections containing only one magnet or even remove the flexible strip material exposing the individual magnets. Once the user has cut

the magnetic tape to the useable required length, the magnetic tape may be applied to a ferrous metal surface (such as the wall of a steel garden shed) and the magnetic tape will adhere to that surface. The magnetic tape may then be used to adhere to other ferrous objects such that a rack of the objects is formed. Should the user wish to apply the magnetic tape to a non-magnetic surface the magnetic tape may be glued, stapled, tied or otherwise adhered to the non-magnetic surface. A person skilled in the art will appreciate that many more applications are possible.

According to a second aspect of the present invention there is provided a packaging arrangement for magnets, said arrangement comprising:

a pair of flexible strips being connected in a face to face relationship with one another and intermediate said connections defining a plurality of pockets; and

a plurality of magnets each being housed within respective of the pockets to permit movement of the magnets therein.

Each of the pockets preferably is formed from a polymeric material.

In one embodiment the pockets may be closed and may be coated or charged with a substance that reduces rusting of the magnets. Magnets such as NdFeB magnets rust relatively quickly and the substance therefore may reduce deterioration of the magnets. The substance may be provided in the form of a coating on the inside of the pockets or, alternatively, the substance may also be provided in the form of a fluid such as a liquid or a gas.

According to a third aspect of the invention there is provided a method of fabricating a magnetic tape, said method comprising the steps of:

locating a plurality of magnets in spaced apart relationship between a pair of flexible strips;

connecting the pair of flexible strips in a face to face relationship with one another wherein a plurality of pockets are formed intermediate said connections, each of the magnets being housed within respective of the pockets which permit movement of the magnets therein.

The connection of the two strips may take place in a sequence of discrete steps after an individual one of the magnets is positioned. Alternatively, the two strips are joined when more than one magnet is positioned between the layers.

The step of joining the two strips preferably is conducted such that the magnets are enclosed. Joining the two strips may be effected by gluing, sewing or stapling but, especially if the flexible strip material is polymeric, comprises welding such as high frequency welding. The two layers of the flexible strip material preferably are provided separately from each other and most preferably are provided in form of two strips which may be substantially identical. The method preferably is a continuous process for the production of a continuous length of the magnetic tape.

Preferred embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings.

Brief Description of the Drawings

Figure 1 shows a schematic representation of a magnetic tape according to an embodiment of the present invention; and

Figure 2 shows a cross-sectional representation of the magnetic tape.

Detailed Description of Preferred Embodiments

Referring to Figures 1 and 2, a magnetic tape according to an embodiment of the present invention is now described. The Figures show a magnetic tape 10 comprising a pair of flexible strips 12 locating magnets 14. In this example the flexible strip material 12 is waterproof.

The flexible strip material 12 may be provided in form a thin polymer of acetate, styrene or PVC as used in packaging materials. Alternatively, the flexible strip material 12 may comprise a fibre reinforced PVC sheet or urethane. This is particularly advantageous for applications requiring durability and weatherproofing. As the thickness of the flexible strip material 12 influences the useful strength of the invention a compromise between durability and required magnetic strength needs to be found.

In another embodiment of the invention the magnetic tape 10 forms an arrangement for packaging magnets and comprises a plurality of pockets that are joined together and are used to accommodate the magnets. In this case the magnetic tape is also composed of a waterproof polymeric material. The magnetic tape may incorporate high strength magnets such as those made of the rare earth alloy NdFeB (Neodymium Iron Boron). The use of these magnets improve the coupling strength of the magnetic strip. On the other hand high strength magnets are difficult to handle and to separate in large quantities and this embodiment of the invention therefore also relates to packaging advantages. By packing the magnets according to the above-described method, the NdFeB magnets become easy to handle and to separate as the flexible strip material provides a means of leverage between the magnets. It also prevents the magnets from chipping and from corrosion providing extended life for the magnets.

A method of producing the magnetic tape according to another embodiment of the invention is now described. Initially two continuous rolls of 50 mm wide stripes of fibre reinforced PVC sheeting are provided. The strips are brought together with a magnet positioned between them. The two strips covering the magnet are then welded together around one of the magnets using high frequency welding whereby the magnet is encapsulated in hermetically sealed capsules. The next magnet is then inserted between the two strips at a distance of approximately 50 mm behind the previous (first) magnet and the process of welding the strips together around the second individual magnet is repeated. This process is continuously repeated until one of the strips of the fibre reinforced PVC sheeting runs out. If one of the strips runs out, it is joined to a new roll of the same material and the process recommences.

Although the invention has been described with reference to particular examples, it will be appreciated by those skilled in the art that the invention may be embodied in many other forms.

The Claims Defining the Invention are:

1. A magnetic tape comprising:

a pair of flexible strips being connected in a face to face relationship with one another and intermediate said connections defining a plurality of pockets; and

a plurality of magnets each being housed within respective of the pockets to permit movement of the magnets therein.

2. A magnetic tape as defined in claim 1 wherein the pair of flexible strips are directly bonded to one another.

3. A magnetic tape as defined in claim 2 wherein the pair of flexible strips are welded to one another.

4. A magnetic tape as defined in any one of the preceding claims wherein the flexible strips are constructed of a polymeric and substantially impervious material.

5. A magnetic tape as defined in any one of the preceding claims wherein the magnets are each disc-shaped.

6. A magnetic tape as defined in any one of the preceding claims wherein the magnets are rare earth magnets.

7. A magnetic tape as defined in any one of the preceding claims wherein the magnets are space longitudinally along the strips in one or more rows.

8. A magnetic tape as defined in any one of the preceding claims wherein each of the magnets within the tape is oriented such that the polarity of the magnets is uniform relative to respective of the pair of flexible strips.

9. A magnetic tape as defined in any one of the preceding claims comprising at least one means for carrying an article.

10. A method of fabricating a magnetic tape, said method comprising the steps of:

locating a plurality of magnets in spaced apart relationship between a pair of flexible strips;

connecting the pair of flexible strips in a face to face relationship with one another wherein a plurality of pockets are formed intermediate said connections, each of the magnets being housed within respective of the pockets which permit movement of the magnets therein.

11. A method as defined in claim 10 wherein the magnets are sequentially located between the pair of strips which are then connected to one another.

12. A method as defined in claim 10 wherein the magnets are in a series of batches located between the pair of strips which are then continuously connected to one another.

13. A method as defined in any one of claims 10 to 12 wherein the steps of connecting the pair of strips involves welding the strips to one another.

14. A method as defined in any one of claims 10 to 13 being a continuous or semi-continuous process for the production of a continuous length of the magnetic tape.

15. A packaging arrangement for magnets, said arrangement comprising:

a pair of flexible strips being connected in a face to face relationship with one another and intermediate said connections defining a plurality of pockets; and

a plurality of magnets each being housed within respective of the pockets to permit movement of the magnets therein.

16. A packaging arrangement in the form of a magnetic tape as defined in any one of claims 2 to 8.

17. A packaging arrangement as defined in either of claims 15 or 16 wherein the interior of the pockets is coated with a substance that reduces rusting of the magnets.

18. A packaging arrangement as defined in either of claims 15 or 16 wherein the pockets are charged with a substance that reduces rusting of the magnets.